

WOBBLING SPRINKLER HEAD

1 BACKGROUND OF THE INVENTION

2
3 The present invention relates to a wobbling
4 sprinkler head and especially to a wobbling sprinkler
5 head for use in irrigation systems and the like.

6 There have been a number of wobbling sprinkler
7 heads used in the past in which the water distribution
8 head of the sprinkler, instead of being rotated in a
9 smooth rotation or instead of following one of the
10 other sprinkler patterns, has a water distribution
11 head which wobbles in a rotating fashion to provide a
12 more even distribution of water. In the Clearman
13 patents, U.S. Pat. No. 4,487,368 and U.S. Pat. No.
14 4,773,594, a control pattern wobbling sprinkler is
15 provided in which a rotating sprinkler head has a
16 wobbling water distribution head mounted on the end
17 thereof which has a plurality of vanes formed in the
18 wobbling portion of the head to force a wobbling
19 motion which results from the loose connection between
20 the distribution head and the supporting arm of the
21 sprinkler head. In the sprinkler of these two
22 patents, a base is provided for ground support and a
23 rotating sprinkler head has the end of the rotating
24 arm bent at an angle so that the loosely attached
25 wobbling head tilts groundward when not being used.
26 Upon initiation of water under pressure to the head,
27 the head is already in a cocked position and forces a
28 rotating action which causes a wobbling rotation of
29 the water head portion. In the J.M. Hait patent, U.S.
30 Pat. No. 3,009,648, an irrigation system is provided
31 in which the sprinkler head has a rotating stream of

1 water issuing therefrom but allows a deflection head
2 to move back and forth. In J.O. Hruby, Jr., U.S. Pat.
3 No. 3,034,728, a lawn sprinkler is shown which has a
4 centrally disposed and vertically extending stem which
5 is made to rotate by the action of the water passing
6 through the sprinkler. The stem is loosely mounted
7 and has an uneven deflecting portion to produce a
8 rotating action of the spray. In the M.S. Aubert
9 patent, U.S. Pat. No. 3,091,400, a dishwashing machine
10 has a rotary wobbling spring head which is driven by
11 the water momentum to wobble the head in a dishwasher.

12 In Applicant's U.S. Patent No. 5,381,960, a
13 wobbling irrigation sprinkler head includes a magnet
14 for the initial tilt in a wobbling irrigation
15 sprinkler head for use on a self-propelled mechanical
16 moving irrigation system, such as a center pivot field
17 irrigation system, having the wobbling sprinkler head
18 facing downward from the water supply conduit. This
19 sprinkler head produces a wobbling motion as a result
20 of the nozzle directing water onto a deflector pad
21 having a predetermined shape with water deflecting
22 grooves which rotates and wobbles the water deflecting
23 head. A magnet is mounted in the sprinkler head base
24 to attract a ferric metal washer mounted in the
25 wobbling deflecting head to tilt the wobbling water
26 deflector head relative to the base to cock the
27 deflector head to initiate the wobbling in the
28 deflector head.

29 In Applicant's prior U.S. Patent No. 5,950,927
30 for a Wobbling Sprinkler Head, a wobbling irrigation
31 sprinkler head is for use on a self-propelled
32 mechanical moving irrigation system, such as a center
33 pivot field irrigation system, in which the sprinkler

1 heads face downward from the water supply conduit.
2 This sprinkler head produces a wobbling motion as a
3 result of the nozzle directing water onto a deflector
4 pad having a predetermined shape with water deflecting
5 grooves which cause a rotation and wobbling of the
6 water deflecting head. The wobbling motion is
7 produced by a wobble mechanism which has a pair of
8 interacting wobble generating members, one mounted on
9 the water deflecting head and the other mounted on the
10 sprinkler body to keep the water deflection head
11 titled at an angle to the water exiting the water
12 nozzle. The interaction of the protruding members
13 forces the deflection head to start wobbling as the
14 deflection head rotates and maintains the wobble. The
15 water deflection head is blocked from the center axis
16 position to keep the water deflecting surface at an
17 angle to the stream of water being emitted from the
18 nozzle.

19 One of the problems that occurs with commercial
20 wobble sprinkler heads is the vibration created in the
21 sprinkler head by the wobbling action which can result
22 in wear and premature failure of a wobbling sprinkler
23 head. The present invention is a wobbling sprinkler
24 head which dampens the vibration in the sprinkler
25 head. A water deflection head is rotated by a stream
26 of water from a water nozzle.

27 In Applicant's U.S. Patent No. 6,176,440, the
28 interaction of a pair of wobble generating members
29 forces the water deflection head to start wobbling as
30 the deflection head rotates. The water deflection
31 head is prevented from the center position by the
32 interacting wobble generating members to keep the
33 water deflecting surface at an angle to the stream of

1 water being emitted from the nozzle. Once the
2 deflection head starts rotating, the protruding
3 members do not touch since the circle of rotation is
4 outside a stationary wobble generating member. A
5 predetermined mass is removably attached to the
6 sprinkler head along the base of the sprinkler head to
7 dampen vibrations in the sprinkler head generated by
8 the wobbling deflector head. The mass is removably
9 attached to allow for the change of the mass depending
10 upon the operating conditions of the sprinkler head.

11 In the present invention, a wobbling sprinkler
12 head has a wobbling deflector located below the nozzle
13 and is weighted to counterbalance the deflector head
14 and reduce vibration.

15

16 SUMMARY OF THE INVENTION

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18 A wobbling sprinkler head has a sprinkler head
19 main frame having a nozzle base having a nozzle
20 therein and at least one arm extending therefrom
21 supporting a deflector supporting base. The nozzle
22 base is attached to a water supply and has a water
23 inlet for directing water through the nozzle. A water
24 deflector head has a shaft movably attached to the
25 deflector supporting base and a water deflecting
26 surface attached to one end of the shaft and
27 positioned to deflect water being emitted from the
28 nozzle. The water deflecting surface has a
29 predetermined shape to cause movement of the water
30 deflector head responsive to water being directed
31 thereagainst. The shaft has a counterbalancing weight
32 on the other end thereof. The water deflecting
33 surface has a protrusion extending therefrom and

1 extends adjacent one side of the nozzle base to
2 thereby tilt the water deflecting head to one side of
3 the nozzle output to thereby cause the water deflector
4 head to wobble responsive to water directed
5 thereagainst from the nozzle. The shaft has a spool
6 bushing between the ends thereof and rides in a
7 deflector base opening. The deflector base opening
8 is large enough to allow the shaft to tilt and wobble
9 during rotation. The water deflection head has a
10 wobbling motion while distributing water from the
11 sprinkler head and at the same time dampens vibrations
12 with the counterweight. The water deflecting surface
13 and the counterweight are removably attached to the
14 shaft by a threaded connection or the like so that the
15 counterweight can be easily changed.

16 17 BRIEF DESCRIPTION OF THE DRAWINGS

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19 Other objects, features, and advantages of the
20 present invention will be apparent from the written
21 description and the drawings in which:

22 Figure 1 is a side elevation of a portion of the
23 water conduit having the present sprinkler head;

24 Figure 2 is a perspective view of a wobbling
25 sprinkler head in accordance with the present
26 invention; and

27 Figure 3 is a cutaway elevation of the sprinkler
28 head of Figures 1 and 2.

29 30 DESCRIPTION OF THE PREFERRED EMBODIMENT

31
32 Referring to Figure 1 of the drawings, a portion
33 of a water conduit of an irrigation system 10 has a

1 central irrigation conduit or water supply pipe 11
2 having a plurality of sprinkler heads 12 attached
3 thereto in a spaced relationship to each other. Each
4 sprinkler head 12 is connected to a drop pipe 13 which
5 is connected with a coupling 14 to the top 15 of the
6 pipe 11. The pipe 13 may be any length desired and
7 has a U-shaped bend and has the sprinkler head 12
8 attached thereto.

9 The sprinkler head 12, as seen in Figures 1-3,
10 includes a main frame 16 having a nozzle base 17
11 having a nozzle 18 therein. The sprinkler head main
12 frame 16 also has a plurality of supporting arms 20
13 extending from the nozzle base 17 and attached to a
14 deflector supporting base 21, leaving an open space 22
15 between the nozzle base 17 and the deflector
16 supporting base 21 with the end 23 of the nozzle 18
17 facing directly downward towards the deflector
18 supporting base 21. A water deflecting head 24 has a
19 water deflecting surface 25 having a plurality of
20 arcuate grooves 26 therein for directing water being
21 emitted from the nozzle 18 tip 23 thereagainst. The
22 water deflecting surface or pad 25 has a protrusion 27
23 extending from the center thereof and is generally
24 cone-shaped and positioned so that it extends adjacent
25 the annular end 28 of the nozzle base 17. The water
26 deflector surface 25 is attached to a deflector mount
27 or base 30 at one end thereof with threads 31. The
28 deflector mount 30 has a shaft 32 attached thereto.
29 A counterweight 33 is pressed into the base of the
30 shaft 32. A spool bushing 34 is positioned between
31 the ends of the deflector mount and the shaft 32. The
32 spool bushing 34 has a center groove 35 with a pair of
33 circular flanges 36 on either side thereof. The

1 groove 35 is sized to fit loosely within the hole 37
2 so as to allow the spool and shaft to rotate on the
3 deflector supporting base 21 and is sufficiently loose
4 to allow the water deflecting head 24 to wobble as it
5 rotates. The protrusion 27 always forces the water
6 deflector head 24 to be in a tilted position so that
7 when rotating, it is forced to wobble as the water
8 being emitted from the nozzle 18 is directed against
9 the water deflecting surface 25 and into the grooves
10 26. The water deflecting surface directs the water
11 outwardly to the area being sprinkled or irrigated.
12 The angle of the grooves 26 forces rotation of the
13 water deflecting head 24 which is held to the
14 deflector supporting base 21 by virtue of the loose
15 mounting of the spool bushing 34 within the water
16 deflector head supporting base opening 37. The water
17 deflector supporting base, as seen in Figure 3, has an
18 open bottom 38 to allow access to the counterweight 33
19 which can advantageously be replaced or changed to
20 vary the characteristics of the wobble of the
21 sprinkling head. The weight 33 tends to hold the
22 wobbling water deflecting head 24 in a generally
23 upright position and dampens vibrations created by the
24 wobbling of the head.

25 The sprinkler head of the present invention
26 utilizes a tripod frame with three supporting arms 20.
27 It allows a deflector head to wobble on a spool
28 bushing mounted to a shaft mounted in a deflector
29 support base and having a counterweight on the bottom
30 of the shaft supporting the deflector pad or surface.
31 Startability is substantially enhanced by extending
32 the apex of the deflector pad upwardly beyond the end
33 of the nozzle housing to create an interference

1 between the water deflector head and the nozzle
2 housing to force the assembly into a tipped position
3 to assure that the water deflector head starts its
4 rotation and wobble. Once the rotation is initiated,
5 the upwardly extending protrusion is no longer in
6 contact with a nozzle housing. Vibration
7 is substantially reduced by counterbalancing of the
8 rotational forces of the water deflector head and is
9 accomplished by adjusting the counterweight 33. Also
10 varying the distance of the counterweight from the
11 rotation point allows a single weight to balance the
12 water deflection head in a variety of flow ranges.

13 It should be clear at this time that an improved
14 wobbling irrigation sprinkler head has been provided
15 which uses a wobbling deflector head mounted below the
16 nozzle and which counterbalances the head with a
17 weight mounted to one end of a shaft having the
18 wobbling deflecting pad mounted to the other end of
19 the shaft. The shaft is supported with a spool
20 bushing riding in an opening in the deflector head
21 supporting base. However, the present invention is
22 not to be construed as limited to the forms shown
23 which are to be considered illustrative rather than
24 restrictive.